

# REPUBLIC OF THE PHILIPPINES

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PNS/PAES 151 (2010) (English): Agricultural machinery - Mechanical Rice Transplanter - Specifications



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# **PHILIPPINE NATIONAL STANDARD**

**PNS/PAES 151:2010  
(PAES published 2010)  
ICS 65.060.01**

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## **Agricultural machinery – Mechanical Rice Transplanter – Specifications**

**JUN 10 2010**



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**National Foreword**

This Philippine Agricultural Engineering Standards PAES 151:2010, Agricultural machinery – Mechanical Rice Transplanter – Specifications was approved for adoption as Philippine National Standard by the Bureau of Product Standards upon the recommendation of the Agricultural Machinery Testing and Evaluation Center (AMTEC) and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development of the Department of Science and Technology (PCARRD-DOST).

## **Foreword**

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Standards for Agricultural Production and Postharvest Machinery” funded by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development - Department of Science and Technology (PCARRD - DOST).

This standard has been technically prepared in accordance with BPS Directives Part 3:2003 – Rules for the Structure and Drafting of International Standards.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others.

In the preparation of this standard, the following documents/publications were considered:

Campbell, J.K. 1990. Dibble sticks, donkeys, and diesels. International Rice Research Institute. ISBN 971-104-185-5. 147-150.

Eam-o-pas, K. and Y. Goto. 1990. Comparative performance of the rice transplanters in Thailand's field conditions. Kasetart J. (Nat.Sci. Suppl.) Vol.24:64-68.

Eam-o-pas, K., V. Munthimkarn, N. Ounkong, Y Goto and T. Yamauchi. 1988. Performance of a self-propelled riding type rice transplanter. Kasetart J. (Nat.Sci. Suppl.) Vol.22:79-87.

Regional Network for Agricultural Machinery. 1983. Test codes and procedures for farm machinery. Technical Series No.12. Economic and Social Commission for Asia and the Pacific.

Regional Network for Agricultural Machinery. 1979. Rice transplanter: highlights of research, design, development and evaluation from different countries. RNAM Digest 1. 43pp.

Thein, M. Mechanical rice transplanters in Burma.

<http://www.knowledgebank.irri.org>

<http://www.steelforge.com/alloysteels.htm>

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**Agricultural Machinery – Mechanical Rice Transplanter – Specifications**

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**1 Scope**

This standard specifies the manufacturing and performance requirements for an engine driven mechanical rice transplanter.

**2 References**

The following normative documents contain provisions, which, through the reference in this text, constitute provisions of this National Standard:

<b>AWS D1.1:2000</b>	Structural Welding Code - Steel
<b>PAES 102: 2000</b>	Agricultural Machinery – Operator’s Manual – Content and Presentation
<b>PAES 152:2010</b>	Agricultural Machinery – Mechanical Rice Transplanter – Methods of Test

**3 Definitions**

For the purpose of this standard, the following definitions shall apply:

**3.1****grasping fork**

part of the transplanting arm that picks rice seedlings

**3.2****mechanical rice transplanter**

machine designed for transplanting rice seedlings into a puddled and leveled field

**3.3****paddle wheel**

modified wheel used in transplanters to facilitate movement in the field

**3.4****root-washed seedlings**

rice seedlings grown in nurseries for transplanting wherein the roots are washed thoroughly to remove the soil

### **3.5**

#### **soil-bearing seedlings**

rice seedlings grown in nursery for transplanting wherein the soil is retained with the roots for transplanting

### **3.6**

#### **transplanting**

method of crop establishment for rice wherein rice seedlings grown in a nursery are pulled and transferred into puddled and leveled fields, 15 to 40 days after seeding

### **3.7**

#### **transplanting arm**

part of the mechanical transplanter that actuates picking and transplanting seedlings into a puddled field

## **4 Classification**

The mechanical rice transplanter shall be classified according to the following:

### **4.1 According to type of seedlings used**

#### **4.1.1 Root-washed seedling type**

Type of mechanical transplanter designed for handling rice seedlings that are removed from the traditional nurseries and washed well with water. The seedlings are neatly arranged on the seedling tray of the transplanter.

#### **4.1.2 Soil-bearing seedling type or mat type**

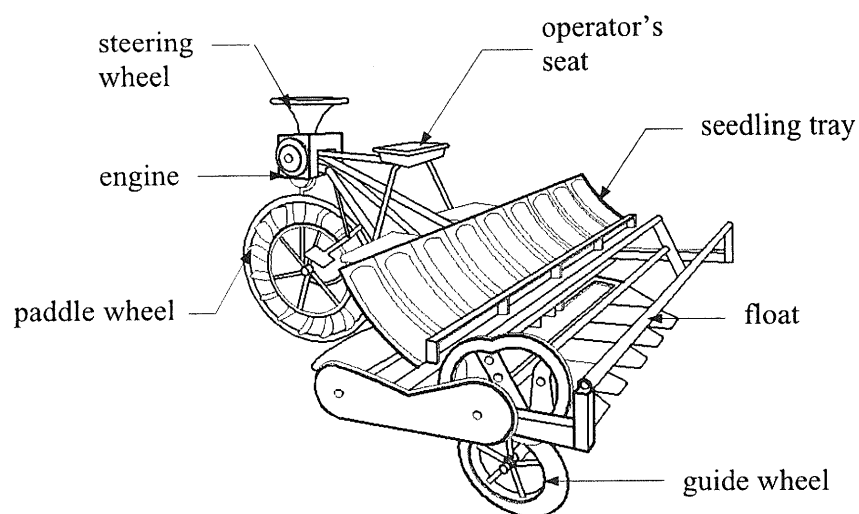
Type of mechanical rice transplanter designed for handling rice seedlings that were grown with mat. Soil and fertilizers were mixed thoroughly and filled uniformly in seedling boxes when growing the seedlings.

### **4.2 Engine driven or self-propelled rice transplanter**

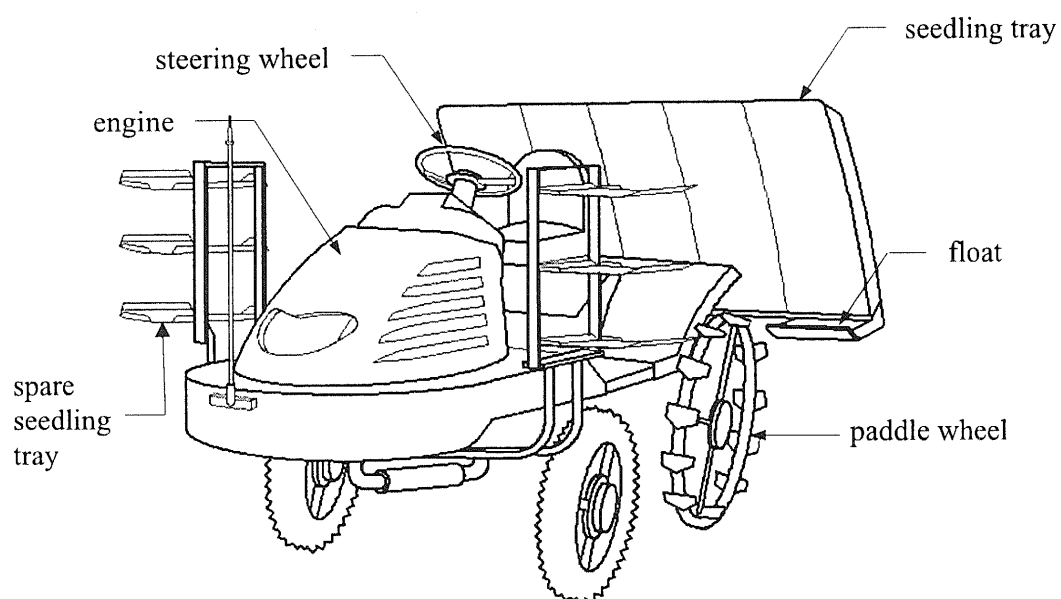
Type of engine driven rice transplanter which makes use of engine to actuate its movement in the puddled field.

#### **4.2.1 Riding type**

Type of self-propelled rice transplanter that allows operator to ride on the machine during operation (Fig. 1)



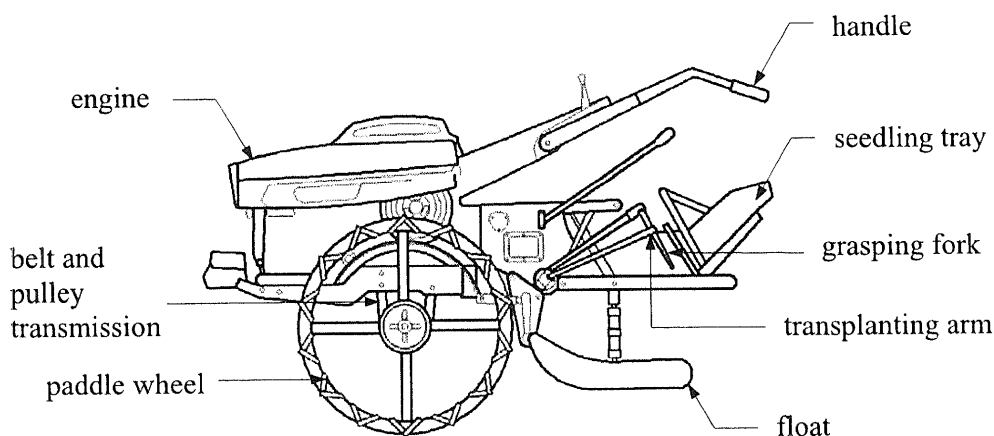
**Figure 1a. Three-wheel riding type rice transplanter**



**Figure 1b. Four-wheel riding type rice transplanter**

#### **4.2.2 Walk-behind type**

Type of self-propelled rice transplanter wherein the operator walks behind the transplanter during operation (Fig. 2).



**Figure 2. Walk-behind rice transplanter**

## **5 Principle of Operation**

Rice seedlings grown in the nursery shall be placed on the seedling tray of the mechanical rice transplanter. As the rice transplanter moves along the puddled field, the grasping fork of the transplanting arm shall get a preset number of seedlings out of the seedling mat. The transplanting arm shall be actuated by a cam assembly which is connected to the PTO shaft of a tractor. The seedlings shall then be directed into the puddled soil. Afterwards, the transplanting arm shall reset back to its original position for the next stroke.

## **6 Manufacturing Requirements**

The mechanical rice transplanter shall consist of seedling tray, transplanting arms, grasping forks and float or floatation structure. Spacing between each transplanting arm shall be uniform.

- 6.1 The seedling tray shall be made of non-corrosive material (e.g. engineering plastic).
- 6.2 The float shall be made of non-corrosive material (e.g. engineering plastic) with at least 13 mm (1/2") thickness and with a width of at least 152 mm (6").
- 6.3 The transplanting arm shall be made of G.I. steel or better material with at least 10 mm diameter. It shall have a uniform spacing of at least 200 mm.
- 6.4 The grasping forks shall be made of G.I. plain sheet gauge #24 or better material.
- 6.5 All bearings shall be sealed to prevent water and dirt from entering it.
- 6.6 All welded parts shall be in accordance with the criteria set in AWS D1.1:2000.

- 6.6.1 There shall be no crack on welded area.
- 6.6.2 There shall be fusion between adjacent layers of weld metal and between weld metal and base metal.
- 6.6.3 All craters shall be filled to provide the specified weld size, except for the end of intermittent fillet welds outside of their effective length.
- 6.6.4 Weld profiles shall be in its acceptable form.
- 6.6.5 Welded joints shall not be less than 4 mm site fillet weld.
- 6.6.6 Undercut shall not exceed 2 mm for any length of weld.
- 6.6.7 The handle shall be covered with a non-slip material (e.g. rubber).
- 6.6.8 The paddle wheel shall be made of G.I. steel or better material. The wheel depth shall be adjustable.
- 6.6.9 Guide wheels shall be made of non-corrosive material (e.g. G.I. steel).
- 6.6.10 Row spacing shall be variable.

## **7 Performance Requirements**

- 7.1 There shall be a field efficiency of at least 80%.
- 7.2 The grasping fork shall pick rice seedlings uniformly.
- 7.3 The distance between hills and rows shall be uniform based on the desired setting.
- 7.4 The percent damaged hills and percent missing hills shall not exceed 10%.
- 7.5 The seedlings shall be planted at a uniform depth based on the desired setting.

## **8 Safety, Workmanship and Finish**

- 8.1 The mechanical rice transplanter shall be painted and shall have a rust-free finish.
- 8.2 Sealed type bearings shall be used to prevent entry of foreign materials.
- 8.3 Chain and sprocket or belt and pulley assembly shall be covered.
- 8.4 All bolts shall conform with standards for strength application and shall be made of hot-galvanized steel for corrosion resistance.

**8.5** The mechanical rice transplanter shall be free from sharp edges.

## **9 Warranty of Construction**

**9.1** The mechanical rice transplanter's construction shall be rigid and durable without breakdown of its major components within three (3) years from the date of original purchase.

**9.2** Warranty shall be provided for parts and services within three (3) years after installation and acceptance by the consumer.

**9.3** Engines shall be covered by a separate warranty.

## **10 Maintenance and Operation**

**10.1** An operator's manual which conforms to PAES 102, shall be provided.

**10.2** Grease points shall be provided.

## **11 Testing**

Testing of the mechanical rice transplanter shall be conducted on-site. It shall be tested for performance in accordance with PAES 152.

## **12 Marking and Labeling**

**12.1** The mechanical rice transplanter shall be marked in English with the following information using a plate, stencil or by directly punching it at the most conspicuous place:

**12.1.1** Brand name or Registered trademark of the manufacturer

**12.1.2** Model and Serial number

**12.1.3** Country of manufacture/assembly (if imported)/"Made in the Philippines" (if manufactured in the Philippines)

**12.2** Safety/precautionary markings shall be provided. Markings shall be stated in English or Filipino and shall be printed in red color with a white background.

**12.3** The markings shall have a durable bond with the base surface material and shall be water and heat resistant under normal cleaning procedures. It shall not fade, discolor, crack or blister and shall remain legible.

## **Philippine Agricultural Engineering Standards**

AMTEC-UPLB – PCARRD Project: “Development of Standards for Agricultural Production and Postharvest Machinery”

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